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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION 10  
1200 Sixth Avenue  
Seattle, WA 98101

February 11, 2004

Reply To  
Attn Of: ECL-111

Jennie Goldberg  
Seattle City Light  
Environment & Safety Division  
P.O. Box 34023  
700 Fifth Avenue, Suite 3300  
Seattle, WA 98104-4023

**Subject: EPA Comments on Draft Report *Sampling and Analysis Plan for Boundary Definition* (dated January 20, 2004)  
Slip 4 Early Action Area  
Lower Duwamish Waterway Superfund Site, Seattle, WA**

Dear Ms. Goldberg:

With this letter, EPA is providing comments on the draft report *Sampling and Analysis Plan for Boundary Definition* (January 20, 2004, prepared by Integral Consulting for the City of Seattle and King County) for the Slip 4 Early Action Area. EPA has reviewed and incorporated relevant comments received from internal reviewers (including EPA's contractor, the ACOE), and external reviewers, including Marla Steinhoff (NOAA), Glen St. Amant (Muckleshoot Tribe), DRCC, and Boeing. The revised report is due to EPA on March 4, 2004.

If you have any questions, please contact me at 206-553-2141 or [keeley.karen@epa.gov](mailto:keeley.karen@epa.gov).

Sincerely,

Karen Keeley  
Project Coordinator

cc (hard copy):  
Jeff Stern, King County  
Betsy Day, Integral Consulting



cc (electronic mail only):

Randy Carman, WDFW

BJ Cummings, DRCC

Bruce Duncan, EPA

Kris Flint, EPA

Skip Fox/Carl Bach, Boeing

Ginna Grepo-Grove, EPA

Brad Helland, Ecology

Allison Hiltner, EPA

Erika Hoffman, EPA

Doug Hotchkiss, Port of Seattle

Rick Huey, Ecology

Lon Kissinger, EPA

Jeff Krausmann, USFWS

Alison O'Sullivan, Suquamish Tribe

Cindy Schuster, EPA

Glen St. Amant, Muckleshoot Tribe

Kym Takasaki, Corps of Engineers

Craig Thompson, Ecology

Greg Wingard, WAP

**EPA Comments on Draft Report**  
***Sampling and Analysis Plan for Boundary Definition***  
**Slip 4 Early Action Area, Lower Duwamish Waterway Superfund Site**

**General Comments**

1. QAPP.

The EPA Quality Assurance and Data Unit reviewed the Quality Assurance Project Plan (QAPP) for this Sampling and Analysis Plan. Based on their review, the QAPP is recommended for final approval and no comments or revisions were identified (see enclosed memorandum from Ginna Grepo-Grove to Karen Keeley dated January 23, 2004). The QAPP should be revised in response to the editorial comments provided below.

2. Historical data sets.

- Exponent Data Set. On January 26, 2004, EPA reviewed and approved the Exponent data set for use [see memorandum from Allison Hiltner, EPA to Lower Duwamish Waterway Group (LDWG) "*Review of Windward Environmental's Additional Quality Assurance Review of Lower Duwamish Waterway Phase 1 Data Sets for use in the Phase 2 Remedial Investigation*"]. Please revise the Sampling and Analysis Plan (SAP) to incorporate a reference to this memorandum.

- Landau Data Set. Figures 4 and 5 of the SAP indicate that the Landau data are under EPA review. As noted in the Task 1 report, a separate data validation report will be submitted to EPA for review and approval, but that data validation report has not yet been submitted to EPA. Data must meet EPA's approval prior to use in the Proposed Boundary Technical Memorandum. Please provide a time frame for submittal of the Landau data validation report to EPA (separate from the SAP). This review must be completed prior to the field sampling effort, in case the Landau data are unacceptable and additional sampling locations are necessary.

- NOAA Data Set. Please clarify in the SAP that although these data are presented in the figures, it is not EPA's intention to use PCB data from a non-standard method in proposing a potential boundary for the early action.

3. Revisions to Surface and Subsurface Sampling Locations.

- One additional surface sediment sample should be collected from the area between SG09 and SG13 because this area is near a potential remediation boundary (based on historical data), and the historical PCB data are primarily from a non-standard method. If appropriate, nearby stations may be slightly adjusted to provide equidistant coverage.

- One additional surface sediment sample should be collected as a composite (e.g., 3 to 5 samples/composite) in the high intertidal area located near the southwestern boundary of First South Properties (e.g., nearshore of SG12). Currently, this high intertidal area is very exposed during low tides, and it is generally not characterized as existing nearby data are primarily located in areas at or below 0 MLLW (in particular, limited data are available in the high intertidal area located east and south of SG12). Also, this area is near a potential remediation boundary area based on historical data.
- One additional surface sediment sample should be collected as a composite (e.g., 3 to 5 samples/composite) in the high intertidal area located near the former log lift (north of the Crowley pier). Currently, this area is not characterized, and nearby surface sediment samples are generally located in areas at or below 0 MLLW. Alternatively, this area (which is a much smaller area than that referenced in the comment above) must be sampled as part of future tiered sampling events that will be used to design the remediation selected for Slip 4. Results of the first tier of sampling may provide information to better locate this high intertidal composite.
- SG18/SC09 (surface and core) should be moved slightly to the east at approximately the same elevation. With this modification, SG18/SC09 will be farther away from an historical data point (Landau study) with PCB concentrations lower than the SQS, and will be closer to an historical data point (Landau study) with PCB concentrations two times the CSL.
- SG22 (surface) should be moved west to the area immediately off the "middle" 8 inch outfall that discharges under Crowley's pier in this area.
- SG23/SC10 should be moved to the northeast to the area that is offshore of the "right" 8 inch outfall that discharges under Crowley's pier in this area, and samples should be analyzed for PAHs and BEHP (in addition to the proposed analytes). This change is recommended because of the elevated PAH concentrations that were detected in SL4-02A (see p. 54 and Figure 5-3 of the Data Summary report). For this area, there is no core data deeper than 6 ft, and the estimate of material dredged is approximately 5 ft based on the maximum elevation change documented in the PSDDA sampling and analysis plan (-12 ft MLLW to -17 ft MLLW). Although it is recognized that this information may not be relevant to establishing the boundary of the early action, the information will be useful for source control actions, given the historical PAH CSL exceedances identified in this area, and the lack of PAH/BEHP surface sediment data for this area (see Figures 5-8, 5-10, and 5-11). If warranted, SG19 may be slightly adjusted to provide equidistant coverage.
- One additional surface sediment sample should be placed south of SG22 and SG23, within the formerly dredged area. This recommendation is based on the fact that SG22 and SG23 have been moved west and east, creating a larger area that should be characterized (nearest stations show PCB values from a non-standard method).

## Specific Comments

4. Minor edits are provided on attached hard copies.
5. Ecology has requested that language be added to the SAP stating that the SAP is prepared in accordance with Ecology's SAPA (May 2003).
6. Section 1, p.1, 2<sup>nd</sup> P. Revise text: "Slip 4 was identified as a candidate early action site by ~~Windward Environmental~~EPA and Ecology (Windward 2003)...".
7. Section 1, p. 2, 2<sup>nd</sup> P. Clarify that additional iterative sampling may also occur pursuant to this SAP. As written, the phrase "including possible additional sampling" implies that additional sampling would only occur as part of the EE/CA.
8. Section 1, p. 2. In the last sentence, revise text: The EE/CA, ~~including possible additional sampling~~, would be performed under a separate ~~AOC~~Work Plan. A decision has not yet been reached on the legal action that will be used for preparing and implementing the EE/CA.
9. Section 1.1. Revise text: "sediments that will be ~~remediated~~removed as an early action area..."
10. Section 2.
  - In the first sentence, revise text to clarify that this section describes the rationale for the sampling design that will generate data to be used to develop an appropriate boundary for the cleanup action in the Slip 4 early action area.
  - "Percent solids" is listed in the text as an analyte for surface and subsurface core samples, but is not shown in Table 4. In Table 3, the analyte is shown as total solids next to Metals – clarify whether this is appropriate (e.g., will only one sample jar be collected for metals and solids analysis? are the preservation and holding times equivalent?).
11. Section 2.1.
  - This section should include a general discussion of the approach and rationale that was used to identify sampling locations. For example, the specific rationale provided for each station in Table 2 could be generalized and summarized in Section 2.1. The rationale would include a discussion of the focus on using historical data (e.g., were PCB concentrations from certain data sets were relied on more than others? were historical PCB data relied on more heavily in the mouth of the slip than in the head of the slip?), interpolated PCB concentration contours, comparisons of PCB data to SMS, the need to fill data gaps based on spatial coverage of historical data, etc. This discussion could

reference the new figure that has been requested and is described below.

- In the 3<sup>rd</sup> paragraph, replace the 3<sup>rd</sup> sentence with the following: "The primary goal of this iteration will be to characterize concentrations of other analytes in the area outside of where PCBs exceed the CSL."

- After the 3<sup>rd</sup> paragraph, it is understood that the first bullet may be interpreted to more broadly refer to full suite analyses necessary to evaluate identified source control issues (suggest deleting the word "point"). Additional bullets should indicate that full SMS analysis may also be considered for design-related issues, and for characterizing elevated BEHP concentrations that were identified in the Data Summary report (e.g., Figure 5-8).

- In the 5<sup>th</sup> paragraph, revise text as follows: "horizon containing the deepest PCB CSL exceedance or an alternative criterion or approach selected by EPA." The distribution of PCBs within the subsurface cores in Slip 4 (e.g., gradually decreasing with depth vs. discontinuous or patchy distribution) will also help determine which additional intervals should be analyzed.

- Finally, it may be appropriate to respond to General Comment 2 (above) in this section.

12. Section 2.2.3. Clarify the transect approach described in this section. It appears that the term "middle portion" refers to transects that are perpendicular to Slip 4, but in viewing Figure 4, it is not readily apparent that there is a higher density of transects near the "middle" of the slip (i.e., near the boundary of First South Properties and The Boeing Company). If appropriate, an additional rationale could be that stations were positioned in areas that needed more characterization based on information provided by the spatial analysis in the Summary of Existing Information report.
13. Section 2.3.1. Revise text: "in Slip 4 to ~~characterize better understand~~ the vertical extent of contamination. ~~Also, in the event that...~~".
14. Section 2.3.2. Text indicates that a "higher density" of samples will be collected from the outer two-thirds than in the inner one-third of the slip. This statement does not appear to be supported by the locations shown in Figure 5.
15. Section 2.3.3.
  - Text indicates that PCB concentrations are highest in the "inner portion" of the slip - do you mean the head/northern portion of the slip? In the second sentence, provide station names to clarify those locations that are being referenced as "axis" versus "shoreline" stations. Add information that these new stations are intended to supplement historical core data. Subsurface cores are not located adjacent to all outfalls - how was it determined that only certain outfalls were selected?

- Revise text: “indicates that the removal boundary ~~may~~will occur in this area ~~or as requested by EPA.~~” Alternative approaches may be necessary if discontinuous or patchy horizontal and vertical contamination profiles are found in subsurface cores.
16. Section 2.3.4.
    - Provide the rationale for the subsurface sampling intervals (e.g., based on past subsurface sample results, inferred sediment deposition rates, or likely remediation depths).
    - Revise text: “Based on existing data ~~and known historical sources~~ (SEA 2004), it is ~~unlikely~~less likely that elevated PCBs will be identified in subsurface sediments in the outer third of the slip.”
  17. Section 2.3.5. Clarify whether “10% of the core samples” refers to initial core samples or initial plus archived core samples (e.g., when additional core samples are analyzed, will additional geotechnical analyses be performed?). Correct the spelling of “Atterberg” (correction also necessary on p. 17). Provide a brief definition of each of the three geotechnical analyses.
  18. Section 3.0, 1<sup>st</sup> P, 1<sup>st</sup> sentence. Add text regarding the contents of this section: field logbook and forms (including a description of how deviations from the FSP will be addressed), waste disposal, field quality control samples, and laboratory analysis.
  19. Section 3.1.1. Per the LDW AOC, Karen Keeley is the “Project Coordinator” rather than RPM. This should be a global change in the SAP and QAPP. Please identify Rick Huey as the Ecology Project Coordinator for the LDW AOC.
  20. Section 3.3.1, 3<sup>rd</sup> P. Clarify the meaning of “each composite area” in this paragraph.
  21. Section 3.3.5. Describe the approach that will be used to address core compaction issues.
  22. Section 3.3.5, p. 16, 2<sup>nd</sup> P. Collected cores should be cut into sections no smaller than 4 feet to minimize impact to the cores between the designated 2-foot sampling intervals. Currently, the text indicates that 3 to 4-foot sections may be prepared.
  23. Section 3.3.5, p. 17.
    - The photographs should clearly show a core that is labelled with the appropriate sample designation (e.g., SL4-SC01C).
    - Additional information should be provided on how the sediment from each interval will be removed from the core using a spoon (e.g., a spoon will be used to create a “trough”

down the center of the entire 2-ft core interval). It should be clearly stated that all sediment within the 2-ft interval will be removed (except for those sediments that are in contact with the walls of the core).

24. Section 3.3.6, 2<sup>nd</sup> P. Identify the minimum distance between the four multiple surface grabs that are proposed for obtaining adequate sample volume.
25. Section 3.3.8. Transportation of cores to Olympia should be addressed in this section.
26. Section 3.4. The logbook should also identify onsite visitors (if any) and the number of photographs taken at the sampling location (if any).
27. Section 3.6.1. Clarify text to identify that field replicates will be collected from separate samples collected alongside the original sampling location. Clarify how the locations for field replicates will be established (e.g., how many feet from the original location?) for both surface and subsurface sampling locations.
28. Section 3.6.2.
  - For consistency with Section 3.6.1, revise the text from “field duplicates” to “field splits.”
  - This section indicates that rinsate blanks will consist of “sampling equipment rinsates.” Clarify what is considered “sampling equipment” (e.g., grab, core tubes, bowls, spoons). Clearly identify how equipment rinsates will be collected (e.g., by running distilled/deionized water over the sampling equipment after decontamination), and specifically describe how the rinsate blank for the core will be collected (e.g., after decontamination, deionized water will be poured through the tube into a bowl, and water from the bowl will be placed into sample jars). Clarify that at least one rinsate sample will be collected from each type of “sampling equipment.”
29. Section 4.4.
  - The Section title “Data Evaluation” should be changed to “Data Management,” which more clearly describes the type of information provided in this section.
  - In addition to describing EQUIS, indicate that data will be submitted electronically to EPA in the SEDQUAL format. This is a requirement of the Work Plan.
30. Figure 2. The second set of purple lines (navigation channel) that appear in the upland area should be removed.



31. Figure 3.

- The dark purple line along the shore (e.g., noticeable on the shoreline of the Duwamish Waterway) does not appear to be represented in the legend.
- In the legend, the "Paved edge" appears to be represented by a gray line, but in the figure the paved edge for Slip 4 appears to be purple (or missing?).

32. Figure 4. Add the source for the bathymetry data.

33. New figure. Provide a new figure that shows Figure 4 of the SAP overlaid on the interpolated PCB values shown in Figure 5-7 from the Summary of Existing Information report.

34. Figure 6.

- Identify Karen Keeley as the "Project Coordinator", consistent with the LDW AOC.
- Add "Rick Huey, Ecology Project Coordinator for the LDW AOC" in a box connected by a line to the "Karen Keeley" box.
- As identified in the QAPP, Sue Dunnihoo should be identified as ARI's "Project Manager".
- Based on text, Maja Tritt should be identified as the Integral Laboratory Coordinator and QA Manager.
- Based on text, Pam Sparks should be identified as the Project QA Coordinator, not the QA Manager.
- The field coordinator position is identified as the Cruise Leader/Safety Officer in the text.
- EPA assumes that the Data Validation firm will be selected prior to submittal of the final QAPP.
- Figure 6 of the SAP and Figure 1 of the QAPP should obviously be identical.

35. Table 1. Text for Footnote 2 is missing.

36. Table 2.

- For each surface grab, identify whether the sample is considered intertidal or subtidal.

- As appropriate, add to the rationale those stations that are placed in areas in consideration of the interpolated PCB values (Figure 5-7 of the Summary of Existing Information report). Stations may include: SG02, SG09, SG11, SG12, SG15, SG18, and SG24.
- SG03. Add to the rationale: Nearby historical data from non-standard PCB method.
- SG04. Clarify what is meant by "unknown outfall."
- SG06. Revise text: this sample is not located near an outfall.
- SG09. Add to the rationale: Nearby historical data from non-standard PCB method, and additional data needed because it is near a potential remediation boundary.
- SG13 and SG17. Add to the rationale: Locations are within an area dredged by Crowley in 1996. Clarify what is meant by "unknown outfall."
- SG26. In the rationale, clarify the reference to the BEHP exceedance, as it appears that SG21 is closer to historically observed BEHP exceedances.

37. Table 3.

- Footnote 4 does not appear to be shown in the table.

- The grain size method identified in this section should be PSEP 1986.

- Add a footnote referring the reader to the Numerical Criteria for Puget Sound Marine Sediments, Table 5-2, Summary of Existing Information and Data Gaps Report.

38. Table 4.

- Per the text, Footnote 3 should clarify that a minimum of 10% of the core samples will be analyzed for geotechnical attributes. Footnote 3 indicates that "geotechnical attributes" includes water content, yet "water content" is shown in the line above geophysical attributes.

- The table should clarify the following: the number of samples for metals and SVOCs are estimates, and how the numbers were estimated; additional subsurface core samples will be analyzed for full suite SMS; and, the number of samples for PCB Aroclors (surface) is 27, not 15 (the associated QC samples should also be revised).

## **Appendix A, Field Forms and Checklists**

39. Field Forms should be modified from SEA to Integral Consulting, and should identify the name of the project on the form.
40. The Sample Log should be revised to show the following: name of the person filling out the field log, the type of sampling equipment, and information regarding station depth (e.g., uncorrected depth, NOS water level, NOS to ACOE level correction, water depth (ACOE MLLW)(station depth information provided on the grab sample log should match the core log). Although the sample log generally contains adequate information, EPA recommends that a more detailed form be prepared to alleviate inconsistencies among language used by various field personnel. For example, rather than having the sampler choose the descriptive term for the sediment type of a sample, the form could be modified to show cobble, gravel, sand CMF, silt clay, organic matter, which could then be marked by the sampler. Similarly, descriptive terms for color and odor could be provided.
41. Photographs of cores should be taken prior to sample processing, and should be marked on the core log form.
42. A chain-of-custody record/sample analysis request form should be added to Appendix A.
43. EPA recommends that a Sample Alteration Form and a Corrective Action Form be prepared to provide consistent records if changes occur (see Terminal 117 project).

## **Appendix B, Quality Assurance Project Plan**

44. Signature page. Add an approval line for "Ecology Project Coordinator for the LDW AOC, Rick Huey."
45. Section A6, p. 2, 3<sup>rd</sup> P. In addition to describing EQUIS, indicate that data will be submitted electronically to EPA in the SEDQUAL format. This is a requirement of the Work Plan.
46. Section A6, p. 3, 2<sup>nd</sup> and 3<sup>rd</sup> P. The discussion of the sampling and reporting schedule should be described in the SAP.
47. Section A6, p. 3, 3<sup>rd</sup> P. Revise text: "...following EPA and Ecology approval...".
48. Section A7. Add the definitions and calculation methods to be used for the PARCC parameters.
49. Section A9.3. Text indicates that "approximately 30 percent of the data" will be fully validated. This is acceptable with the understanding that a minimum of 20 percent of the

data must be fully validated.

50. Section B4, p. 10.

- The TOC method identified in this section (Plumb 1981) is incorrect, and should be revised to EPA 9060.

- The total solids method identified in this section (EPA method 160.3) is incorrect, and should be revised to PSEP.

- Based on information in the text on the PCB method (8082 with modifications recommended by PSEP 1997a), Footnote 4 of Table 3 should be modified to include this additional information.

51. Section B5.1. Please add the field QC criteria that the data will be reviewed against (e.g., what will the RPDs for field splits/repes be evaluated against?).

52. Section B10.2. Revise text to clarify that the electronic data will also be provided to EPA in SEDQUAL format.

53. Table 1. Edits are provided on the attached hard copy.

54. Tables 2 and 3. Comments on Table 4 of the SAP also apply to this table.

55. Table 5. Footnote 4 does not appear to be represented in the table.

**Appendix C, Health and Safety Plan**

56. Section 1, 1<sup>st</sup> P, 1<sup>st</sup> sentence. Provide the complete name of the Slip 4 report (i.e., Sampling and Analysis Plan for Boundary Definition).

57. Section 1, 4<sup>th</sup> P. Clarify that this HSP will also be maintained onsite by any personnel that may collect samples during low tides by walking the beach area (consistent with Section 3.3. of the SAP).

58. Section 4. Confirm whether the reference to a “wet, rocky beach” is appropriate.

59. Section 6.1.1. Clarify text: On page 19, Thompson and Fitzgerald are specifically identified as the Site Safety Officer and Deputy Site Safety Officer, respectively.

60. Table 2. If the designations of Site Safety Officer and Deputy Site Safety Officer are correct, this distinction should be adequately represented in the main SAP.

61. Confirm that the main text of the HSP includes a reference to Appendix C.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION 10  
1200 Sixth Avenue  
Seattle, Washington 98101

Reply To  
Attn of: MGREPOGR  
OEA-095

January 23, 2003

**MEMORANDUM**

SUBJECT: QA Review of the Quality Assurance Project Plan (QAPP) for the Boundary  
Definition of Lower Duwamish Slip 4 Early Action Area  
Seattle City Light and King County January 20, 2004

FROM: Ginna Grepo-Grove, Chemist  
Quality Assurance and Data Unit, OEA

TO: Karen Keeley, EPA Project Manager  
Office of Environmental Clean-up

CC: Roy Araki, RQAM, EPA

The review of the above referenced document has been completed. The QAPP was prepared by Integral Consulting, Inc. for the City of Seattle and King County. The QAPP was prepared in compliance with the EPA Order 5360.1 A2 and the national consensus standard, ANSI/ASQC E4-1994, "*Specifications and Guidelines for Environmental Data Collection and Environmental Technology Programs*" and in accordance with the EPA-QA/R5 document "*EPA Requirements for Quality Assurance Project Plans*", 2001.

In general, the QAPP together with the Sampling Analysis Plan and the Data Gaps Analysis report contain sufficient information to provide the sampling scheme rationale and technical details required by the project. All of the relevant information for sample collection, analysis, data generation and management have been adequately discussed in project SAP and QAPP.

The QAPP for this site, therefore is recommended for final approval by the EPA Regional QA Manager and site Project Manager. Sample collection and other project-specific activities can commence as scheduled.